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| 09/851,970 | 05/10/2001 | Seiji Umemoto | Q64435 | 4097 |

7590 01/27/2005
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Washington, DC 20037

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| EXAMINER |
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RUDE, TIMOTHY L

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| ART UNIT | PAPER NUMBER |
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2883

DATE MAILED: 01/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,970

Applicant(s)

UMEMOTO ET AL.

Examiner

Timothy L Rude

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

In view of the appeal brief filed on 27 October 2004, PROSECUTION IS
HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the
following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply
under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied
by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130,
1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Please note: It is respectfully pointed out that, contrary to Applicant's remarks on
the cover letter of Appeal Brief filed 27 October 2004, the course of action taken by the
Office on 27 July 2004 was proper under the present rules promulgated by the PTO on
12 August 2004, and this action is proper under said present rules promulgated by the
PTO on 12 August 2004.

Double Patenting

1. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of copending Application No. 09/898,060. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 09/883,941. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at

shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of copending Application No. 09/878,268. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-38 of copending Application No. 10/225,532. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent

substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

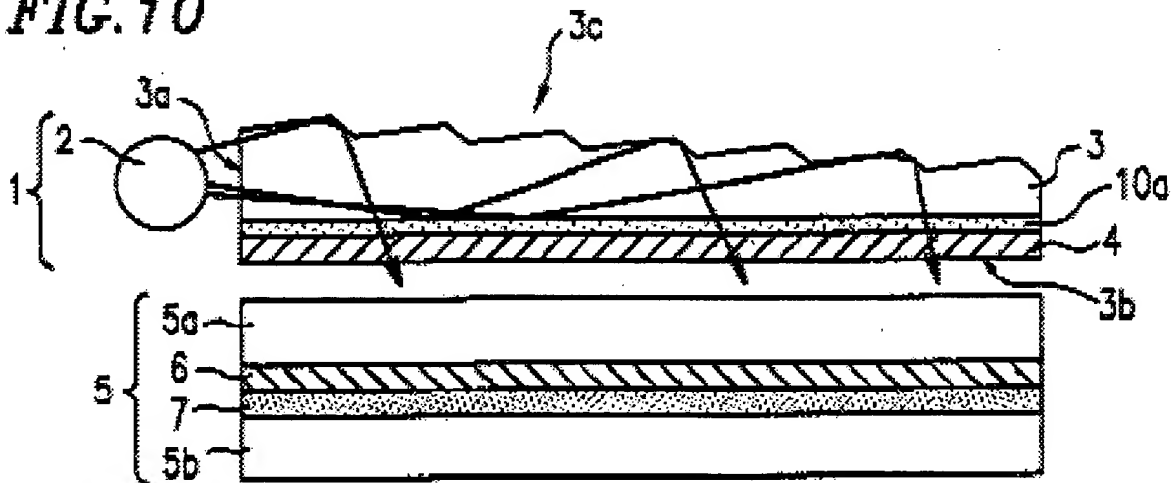
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al (Masuda) USPAT 6,340,999 B1, in view of Egawa et al (Egawa) USPAT 6,295,104 B1.

As to claim 1, Masuda discloses in Embodiment 3, Figure 10, (col. 15, line 25 through col. 18, line 16) a reflection type liquid-crystal display device comprising: a reflection type liquid-crystal display panel, 5, including a liquid-crystal cell and a reflector, 7, said liquid-crystal cell having a visual-side substrate, 5a, a back-side

substrate, 5b, and a liquid crystal, 6, said visual-side substrate including a light guide, 3 (Applicant's transparent substrate), a low-refractive resin layer, 10a (Applicant's transparent layer), lower in reflective index (1.38, col. 15, lines 35-39) than the transparent substrate (1.49, col. 15, lines 35-39), and a transparent electrode (not shown), said back-side substrate having an electrode (not shown), said liquid crystal being held between said visual-side and back-side substrates so that respective electrode sides of said visual-side and back-side substrates are disposed opposite to each other, said reflector being disposed on the back-side substrate side (per Figure 10);

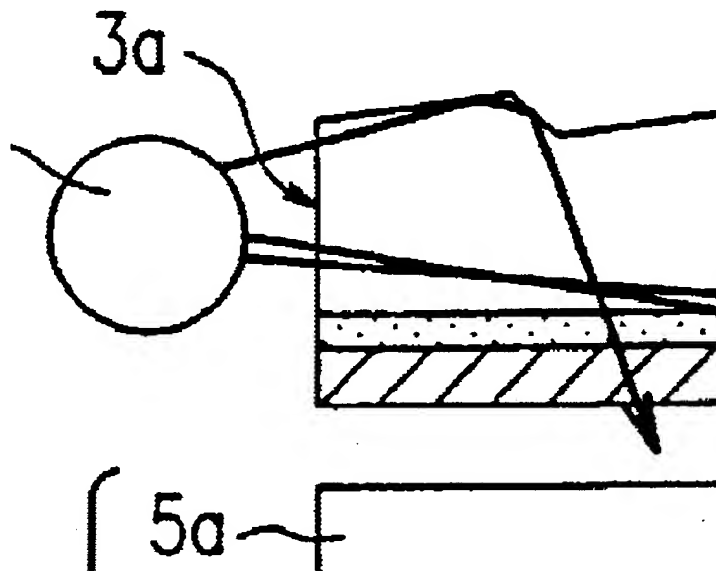
FIG. 10



at least one illuminator, 2, disposed on one of side surfaces of said reflection type liquid-crystal display panel; and
an optical path control layer having a repetitive structure of optical path changing slopes, 3c, on an outer side of said visual-side substrate and being higher in refractive

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index (1.49, col. 15, lines 35-39) than said low-refractive-index transparent layer, each of said optical path changing slopes being inclined at an inclination angle in a range of from 35 to 48 degrees with respect to a reference plane of said visual-side substrate as graphically illustrated by the light path arrow in the upper portion of Figure 10 below.



Masuda does not explicitly disclose and Applicant does not explicitly claim an optical path control layer having a repetitive structure of optical path changing slopes, on an outer side of said visual-side substrate that is not integral to the transparent substrate. However, making integral or making separable the parts of the visual-side substrate are species not considered patentably distinct. It would have been obvious to one having ordinary skill in the art at the time the invention was made to comprise the claimed structure of the visual-side substrate as an art-recognized species suitable for the intended purpose of forming a transparent substrate (MPEP 2144.07).

Masuda does not explicitly teach in the text that his angle of slopes illustrated in Figure 10 are within the range of 35 to 48 degrees.

Egawa teaches the use of [col. 8, lines 28-33] angle of slope (alpha) in the range of 46 to 52 degrees from vertical [equates to 38 to 44 degrees from Applicant's reference plane of the visual side substrate which overlaps Applicant's claimed range of 35 to 48 degrees] to improve contrast and eliminate unwanted moiré pattern for improved display performance [Abstract].

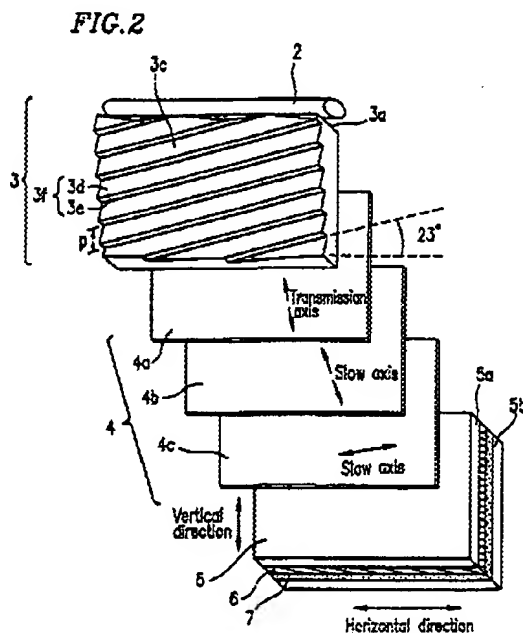
Egawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add an angle of slope of 38 to 44 degrees to improve contrast and eliminate unwanted moiré pattern for improved display performance.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda with the angle of slope of 38 to 44 degrees to improve contrast and eliminate unwanted moiré pattern for improved display performance.

As to claim 2, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein said low-refractive-index transparent layer is disposed between said transparent substrate and said transparent electrode, and there is a difference in refractive index by $(1.49 - 1.38) = 0.11$ (Applicant's 0.05 or more) between said transparent layer and said transparent substrate (col. 15, lines 35-39).

As to claim 3, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein at least said visual-side substrate in said liquid-crystal cell is made of polymethylmethacrylate (refractive index 1.49, col. 15, lines 35-39) (Applicant's optically isotropic material).

As to claim 4, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein said liquid-crystal display panel further includes one polarizer, 4a, disposed on one side of said liquid-crystal cell (col. 15, line 27-30).



As to claim 5, Masuda discloses a reflection type liquid-crystal display device according to claim 4, wherein said liquid-crystal display panel further includes at least one layer of phase retarder, 4c, disposed between said liquid-crystal cell and said polarizer.

As to claim 6, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein: said optical path control layer is constituted by a repetitive structure of prism-like structures, 3f; and each of said optical path changing slopes in said optical path control layer faces said illuminator, 2 (see also Figure 10).

As to claim 7, Masuda discloses a reflection type liquid-crystal display device according to claim 6, wherein each of said prism-like structures in said optical path control layer is constituted by a concave portion shaped substantially like a triangle in section (Figure 10).

As to claim 8, Masuda discloses a reflection type liquid-crystal display device according to claim 7, wherein each of said prism-like concave portions is constituted by a continuous groove which extends from one end to the other end of said optical path control layer in a ridgeline direction parallel with or inclined to said side surface of said liquid-crystal display panel on which said illuminator is disposed (Figure 2).

As to claim 12, Masuda discloses a reflection type liquid-crystal display device according to claim 6, wherein each of said prism-like structures in said optical path control layer is constituted by a concave or convex portion shaped, in section, substantially like a triangle or quadrangle having at least two optical path changing slopes facing said illuminators (Figure 10).

As to claims 13 and 14, Masuda discloses a reflection type liquid-crystal display device according to claim 12 wherein said inclination angle of each of said optical path changing slopes in said optical path control layer is in a range of from 38 to 45 degrees, except wherein said illuminators are disposed on at least two of side surfaces of said liquid-crystal display panel.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate said illuminator so that illuminators are disposed on at least two of side surfaces of said liquid-crystal display panel since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

3. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Egawa, as applied to claims 1 and 7 above, in view of Evanicky et al (Evanicky) USPAT 6,243,068 B1.

As to claims 13 and 14, Masuda in view of Egawa discloses a reflection type liquid-crystal display device according to claim 12, wherein said inclination angle of each of said optical path changing slopes in said optical path control layer is in a range of from 38 to 45 degrees.

Masuda in view of Egawa do not explicitly disclose illuminators disposed on at least two of side surfaces of said liquid-crystal display panel.

Evanicky teaches the use of illuminators disposed on at least two of the side surfaces to provide greater brightness [col. 16, lines 37-46].

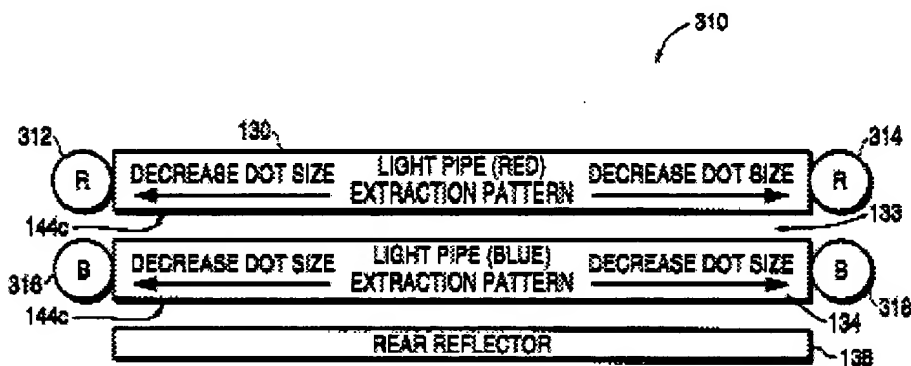


FIG. 10A

Evanicky is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add illuminators disposed on at least two of the side surfaces to provide greater brightness.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda in view of Egawa with the illuminators disposed on at least two of the side surfaces of Evanicky to provide greater brightness.

4. Claims 9-11 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Egawa, as applied to claims 1 and 7 above, in view of Yano et al (Yano) Japanese Patent Abstract Publication 11-326903.

As to claims 9-11, Masuda in view of Egawa discloses a reflection type liquid-crystal display device according to claim 7.

Masuda in view of Egawa does not explicitly disclose a device wherein said prism-like concave portions are constituted by discontinuous grooves each having a length not smaller than 5 times as large as a depth of said groove.

Yano teaches that the grooves may be formed parallel to the light source and continuously or as a prism-like irregularity formed as a series of heights or crevices where the ridgeline continued and may be formed in the direction of a ridgeline which has a predetermined interval and was arranged discontinuously as intermittent heights or a crevice [0044] and Drawings 1-4.

Yano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add prism-like concave portions are constituted by discontinuous grooves each having a length not smaller than 5 times as large as a depth of said groove.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda in view of Egawa with the prism-like concave portions are constituted by discontinuous grooves

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each having a length not smaller than 5 times as large as a depth of said groove of Yano since it has been held that discovering an optimum value of a results effective variable involves only routine skill in the art.

As to claims 15-17, Masuda in view of Egawa discloses a reflection type liquid-crystal display device according to claim 1.

Masuda in view of Egawa does not explicitly disclose a device wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low refractive index transparent layer, wherein said adhesive layer is constituted by a tacky layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive layer is higher by 0.05 or more than that of said low-refractive-index transparent layer.

Yano teaches the use of transparent glue (Applicant's tacky adhesive layer) having a refractive index of 1.40-1.55 which would result in the refractive index of said adhesive layer being higher by at least $(1.40 - 1.38) = 0.12$ (Applicant's 0.05 or more) than that of said low-refractive-index transparent layer to provide a bright display with only low-power light [0053].

Yano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a device wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low

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refractive index transparent layer, wherein said adhesive layer is constituted by a tacky layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive layer is higher by 0.05 or more than that of said low-refractive-index transparent layer to provide a bright display with only low-power light.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda in view of Egawa wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low refractive index transparent layer, wherein said adhesive layer is constituted by a tacky layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive layer is higher by 0.05 or more than that of said low-refractive-index transparent layer of Yano to provide a bright display with only low-power light.

5. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Egawa, as applied to claim 1 above, in view of Nemoto et al (Nemoto) USPAT 6,456,344 B1.

As to claims 18 and 19, Masuda in view of Egawa discloses a reflection type liquid-crystal display device according to claim 1.

Nemoto is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add at least one side surface of said visual-side

substrate is protruded outward from that of said back-side substrate; and each illuminator is disposed on said protruded side surface of said visual-side substrate, and wherein each illuminator is disposed and held on said side surface of said visual-side substrate in such a manner that said illuminator is enclosed by a reflection type light source holder and end portions of said light source holder are bonded to end portions of upper and lower surfaces of said visual-side substrate to comprise a lighted display.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda in view of Egawa with the at least one side surface of said visual-side substrate is protruded outward from that of said back-side substrate; and each illuminator is disposed on said protruded side surface of said visual-side substrate, and wherein each illuminator is disposed and held on said side surface of said visual-side substrate in such a manner that said illuminator is enclosed by a reflection type light source holder and end portions of said light source holder are bonded to end portions of upper and lower surfaces of said visual-side substrate as an art-recognized means suitable for the intended purpose of comprising a lighted display (MPEP 21.07).

Response to Arguments

6. Applicant's arguments filed on 27 October 2004 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) Regarding claim 1, the drawing of Masuda is not to scale, is of little value (MPEP 2125), and so does not confirm slopes inclined 35-48°.

(2) There is no suggestion to impart the light transmission function to the visual side substrate.

(3) Regarding claim 2, Masuda discloses a low-reflective resin layer between the light guide and the outer side of the LCD panel.

(4) The front light of Masuda is not part of the reflective type liquid crystal display panel.

(5) Examiner's multiple layers identified as a single substrate is unreasonable.

(6) Examiner's identification of a single element as both a visual side substrate and an optical path control layer is unreasonable.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that drawings that are not to scale are generally of little value when making determinations as to dimensions. However, they tend to be quite reliable for ray traces, because the drawing must convey the path of the ray. The drawing of Masuda clearly indicates a ray path that makes a turn of about 90° which would be achieved with slopes inclined 35-48° (a practice well known in the art at the time the claimed invention was made). Furthermore, Masuda clearly teaches the angle as a results effective variable, optimization of which takes only ordinary skill in the art of liquid crystals (MPEP 2144.05). However, Egawa is applied as further proof that the

use of slopes inclined 35-48° was well known in the art at the time the claimed invention was made, with proper motivation to combine.

(2) It is respectfully pointed out that the claims are in comprising format. The fact that there are additional transparent substrates on the visual side of the prior art display does not invalidate the rejection. Precluding structure (precluding additional substrates) requires specific claim language, e.g., consisting of, and extra support in the specification, e.g., the device will not work with the additional structure.

(3) It is respectfully pointed out that the claims are in comprising format. The fact that there are additional transparent substrates on the visual side of the prior art display does not invalidate the rejection. Precluding structure (precluding additional substrate between the light guide substrate and the liquid crystal layer) requires specific claim language, e.g., consisting of, and extra support in the specification, e.g., the device will not work with the additional structure.

(4) It is respectfully pointed out that the front light of Masuda is part of the reflective type liquid crystal display panel as it is delivered to an end user. That is to say, the liquid crystal display panel of Masuda includes a front light after assembly. Please note that prosecution requires the most broad reasonable interpretation of the claims, and it is as reasonable to consider the panel of Masuda to include a front light as it is to consider the panel of the instant Application to include a front light.

(5) It is respectfully pointed out that a single substrate is not claimed. The claimed structure is in comprising format and it appears in the prior art as broadly claimed per rejections above.

(6) It is respectfully pointed out that discrete as opposed to dual-purpose elements are not claimed. The claimed functional structure is in comprising format and it appears in the prior art as broadly claimed per rejections above.

Any references cited but not applied are relevant to the instant Application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Timothy L Rude
Examiner
Art Unit 2883

tlr



Frank G. Font
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